

Translation

PATENT COOPERATION TREATY

PCT/EP2003/012556



PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference 0000054060 | FOR FURTHER ACTION See Form PCT/IPEA/416 | |
| International application No. PCT/EP2003/012556 | International filing date (day/month/year) 11 November 2003 (11.11.2003) | Priority date (day/month/year) 13 November 2002 (13.11.2002) |
| International Patent Classification (IPC) or national classification and IPC C07D 223/10 | | |
| Applicant BASF AKTIENGESELLSCHAFT | | |

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| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>2</u> sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> | |
| <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p> | |

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| Date of submission of the demand 26 February 2004 (26.02.2004) | Date of completion of this report 22 February 2005 (22.02.2005) |
| Name and mailing address of the IPEA/EP | Authorized officer |
| Facsimile No. | Telephone No. |

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2003/012556

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on translations from the original language into the following language _____, which is language of a translation furnished for the purpose of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☐ The international application as originally filed/furnished
- ☒ the description:
- pages _____ 1-16 _____, as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- pages _____, as originally filed/furnished
- pages* _____, as amended (together with any statement) under Article 19
- pages* 1-8 received by this Authority on 11 November 2004 (11.11.2004)
- pages* _____ received by this Authority on _____
- ☐ the drawings:
- pages _____, as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP 03/12556

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|--------|-----|-----|
| Novelty (N) | Claims | 1-8 | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | | YES |
| | Claims | 1-8 | NO |
| Industrial applicability (IA) | Claims | 1-8 | YES |
| | Claims | | NO |

2. Citations and explanations

1. Prior art

The documents cited in the search report

D1: EP-A-0 022 161 (BASF AG) 14 January 1981 (1981-01-14)

D2: US-A-5 693 793 (FISCHER ROLF ET AL) 2 December 1997 (1997-12-02)

D3: EP-A-0 306 874 (BASF AG) 15 March 1989 (1989-03-15)

were taken into account for the substantive examination.

2. Novelty

The claims appear to meet the requirements of PCT Article 33(2). D1 to D3 do not describe adjusting a second partial flow in terms of its weight percentage of caprolactam for separating high boilers from crude lactam.

3. Inventive step

The present application does not, however, meet the requirements of PCT Article 33(3).

The closest prior art is represented equally by D1 to D3. The essence of the present method is that of adjusting the second partial flow (via the bottom), the caprolactam concentration not being less than 10 wt.% and the bottom temperature not being less than 170°C. The specified bottom temperature is entirely conventional (known, for example, from D1 and D3), and fluctuates according to the pressure applied. Thus the remaining technical feature for the assessment of inventive step is the lower limit of 10 wt.% caprolactam, below which the concentration should not fall (via the bottom). Although this feature as such is not explicitly mentioned in D1 to D3, the reprocessing steps are similar to those in D1 and D2: after cyclization to caprolactam, first ammonia and water and optionally solvent are removed and then the crude lactam is purified by distillation (see, for example, D2, column 3, lines 52-60 and example 1, column 8, lines 8-16). The present method could therefore be regarded as, for example, a new selection from that of D2.

However, it is not discernible from the present examples whether the feature in question (at least 10 wt.% caprolactam) leads to an improved method variant (for example, blockage of the distillation column). (Comparative) example 1 specifies only the high boiler concentration removed via the bottom. It is not clear to what extent this concerns the weight percentage of caprolactam itself. If it is intended to be 75%, or 20%, at least for the range of 10-20% (and optionally more) caprolactam no advantage would be demonstrated.

The applicant's argument according to the written response is also not sufficient for the

acknowledgement of inventive step for the following reasons:

If the high boiler concentration in the amount removed via the bottom is increased, the concentration of high boiler in the bottom would, naturally, be lower. From a given point, it seems logical that solid matter would form because the high boiler concentration would no longer be sufficient for keeping the bottom as a whole in a liquid phase. The results of example 1 in relation to comparative example 1 therefore do not appear to be surprising or unexpected. Similar results are to be expected when the temperature is simply lowered. From a given temperature, solid matter formation in the bottom is also expected. The results of example 1 in relation to comparative example 2 are therefore also not regarded as surprising.

The present information is therefore not sufficient for establishing an inventive step for the claimed method. The subject matter of the present claims must therefore be regarded as the optimization of a method that is known in principle, without there being any surprising effect.

4. Industrial applicability

No objections.